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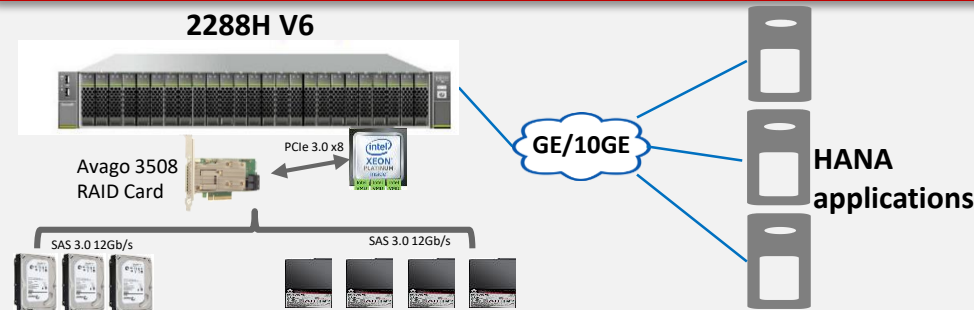
Huawei 2288H V6 for B1 on HANA Intel Ice lake

Version: V1.0(2021-06-22)
enterprise.huawei.com
HUAWEI TECHNOLOGIES CO., LTD.



Huawei Solutions 2288H V6 for B1 on HANA---Read-Sensitive SAS SSD

Deployment Overview



OS and shared volume	Data and log volume
2x to 4x 1.8TB SAS HDD (RAID 1 or RAID5)	2x (RAID 1), 3-16x(RAID 5) 960GB SAS SSD
2x to 4x 1.8TB SAS HDD (RAID 1 or RAID5)	2x (RAID 1), 3-9x(RAID 5) 1.92TB SAS SSD
2x to 4x 1.8TB SAS HDD (RAID 1 or RAID5)	2x (RAID 1), 3-5x(RAID 5) 3.84TB SAS SSD
OS volume	Data 、 log and shared volume
2x 600GB SAS HDD (RAID 1)	2x (RAID 1), 3-21x(RAID 5) 960GB SAS SSD
2x 600GB SAS HDD (RAID 1)	2x (RAID 1), 3-11x(RAID 5) 1.92TB SAS SSD
2x 600GB SAS HDD (RAID 1)	2x (RAID 1), 3-6x(RAID 5) 3.84TB SAS SSD

Disk Model	Size	Interface	Sequential Read/Write Bandwidth@1MB	Random Read/Write IOPS@4KB	Disk Specification Link
ES3500S V5	960GB	SAS 3.0 12Gb/s	2200/900 MB/s	335k/38k	https://e.huawei.com/en/material/datacenter/server/e168646968ed445d850639b048c263df
	1.92TB		2200/1800 MB/s	425k/75k	
	3.84TB		2200/2000 MB/s@1MB	430k/108k	

Materials

- ❖ **CPU/Memory:**
 - ❖ 2* Ice lake 4310/4314/5318Y/8368/8380
 - ❖ 256GB~4TB memory
- ❖ **Local Storage1:**
 - ❖ SP450C-M(AVAGO3508) RAID CARD (2G cache) (for SAS/SATA)
 - ❖ 2x to 4x 1.8TB SAS HDD (RAID 1 or RAID5)
 - ❖ 2x (RAID 1),3-16x(RAID 5) 960GB SAS SSD; or 2x (RAID 1),3-9x(RAID 5) 1.92TB SAS SSD; or 2x (RAID 1), 3-5x(RAID 5) 3.84TB SAS SSD
- ❖ **Local Storage2:**
 - ❖ SP450C-M(AVAGO3508) RAID CARD (2G cache) (for SAS/SATA)
 - ❖ 2x 600GB SAS HDD (RAID 1)
 - ❖ 2x (RAID 1),3-21x(RAID 5) 960GB SAS SSD; or 2x (RAID 1),3-11x(RAID 5) 1.92TB SAS SSD; or 2x (RAID 1), 3-6x(RAID 5) 3.84TB SAS SSD
- ❖ **Network:**
 - ❖ 1x 2*10GE Nic Ports (Pcie card)

The SP450C-M raid card (Avago SAS3508) is an 8-port 12 Gbit/s SAS controller based on the **MegaRAID** architecture. Equipped with **PCIe 3.0 x8** ports and a powerful I/O storage engine.

With our test, the max bandwidth of 3508 is about 6.8 GB/s.

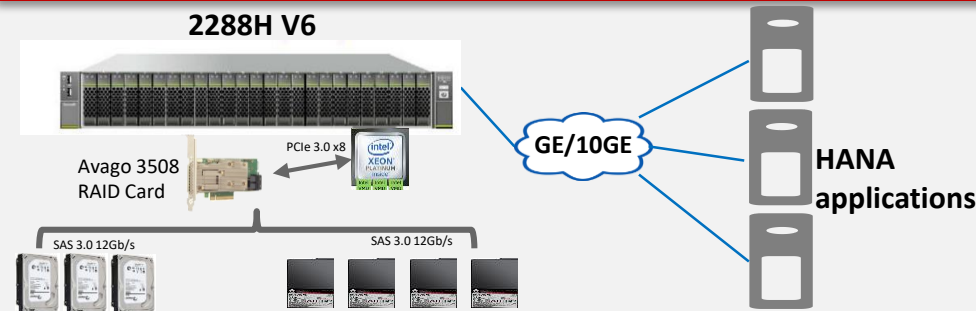
The SP450C-M raid card is equivalent of MegaRAID 9460-8i raid card, and can connect only SAS and SATA devices.

The detail specification shows in

'<https://support.huawei.com/enterprise/en/doc/EDOC1000163569/39417565/overview>' and '<https://www.broadcom.com/products/storage/raid-controllers/megaraid-9460-8i>'.

Huawei Solutions 2288H V6 for B1 on HANA---Read-Write-Mix SAS SSD configuration

Deployment Overview



OS and shared volume	Data and log volume
2x to 4x 1.8TB SAS HDD (RAID 1 or RAID5)	2x (RAID 1), 3-10x(RAID 5) 1.6TB SAS SSD
2x to 4x 1.8TB SAS HDD (RAID 1 or RAID5)	2x (RAID 1), 3-6x(RAID 5) 3.2TB SAS SSD
OS volume	Data 、 log and shared volume
2x 600GB SAS HDD (RAID 1)	2x (RAID 1), 3-13x(RAID 5) 1.6TB SAS SSD
2x 600GB SAS HDD (RAID 1)	2x (RAID 1), 3-7x(RAID 5) 3.2TB SAS SSD

Disk Model	Size	Interface	Sequential Read/Write Bandwidth@1MB	Random Read/Write IOPS@4KB	Disk Specification Link
ES3600S V5	1.6TB	SAS 3.0	2200/1800 MB/s@1MB	425k/155k	https://e.huawei.com/en/material/datacenter/server/e168646968ed445d850639b048c263df
	3.2TB	12Gb/s	2200/2000 MB/s@1MB	430k/155k	

Materials

- ❖ **CPU/Memory:**
 - ❖ 2* Ice lake 4310/4314/5318Y/8368/8380
 - ❖ 256GB~4TB memory
- ❖ **Local Storage1:**
 - ❖ SP450C-M(AVAGO3508) RAID CARD (2G cache) (for SAS/SATA)
 - ❖ 2x to 4x 1.8TB SAS HDD (RAID 1 or RAID5)
 - ❖ 2x (RAID 1), 3-10x(RAID 5) 1.6TB SAS SSD; or 2x (RAID 1), 3-6x(RAID 5) 3.2TB SAS SSD
- ❖ **Local Storage2:**
 - ❖ SP450C-M(AVAGO3508) RAID CARD (2G cache) (for SAS/SATA)
 - ❖ 2x 600GB SAS HDD (RAID 1)
 - ❖ 2x (RAID 1), 3-13x(RAID 5) 1.6TB SAS SSD; or 2x (RAID 1), 3-7x(RAID 5) 3.2TB SAS SSD
- ❖ **Network:**
 - ❖ 1x 2*10GE Nic Ports (Pcie card)

The SP450C-M raid card (Avago SAS3508) is an 8-port 12 Gbit/s SAS controller based on the **MegaRAID** architecture. Equipped with **PCIe 3.0 x8** ports and a powerful I/O storage engine.

With our test, the max bandwidth of 3508 is about 6.8 GB/s.

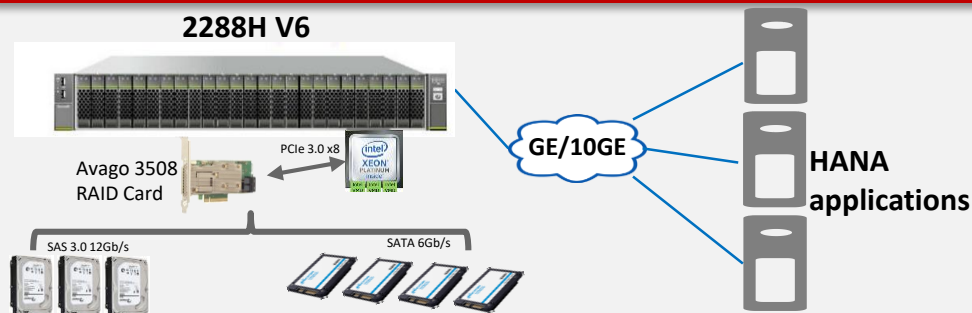
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'<https://support.huawei.com/enterprise/en/doc/EDOC1000163569/39417565/overview>' and '<https://www.broadcom.com/products/storage/raid-controllers/megaraid-9460-8i>'.

Huawei Solutions 2288H V6 for B1 on HANA---SATA SSD configuration

Deployment Overview



OS and shared volume	Data and log volume
2x to 4x 1.8TB SAS HDD (RAID 1 or RAID5)	4-9x(RAID 5) 1.92TB SATA SSD
OS volume	Data 、 log and shared volume
2x 600GB SAS HDD (RAID 1)	4-11x(RAID 5) 1.92TB SATA SSD

Disk Model	Size	Interface	Sequential Read/Write Bandwidth@128KB	Random Read/Write IOPS@4KB	Disk Specification Link
Micron 5300 MAX	1.92TB	SATA 6Gb/s	540/520 MB/s	95k/70k	https://www.micron.com/-/media/client/global/documents/products/product-flyer/5300_product_brief.pdf

Materials

❖ CPU/Memory:

- ❖ 2* Ice lake 4310/4314/5318Y/8368/8380
- ❖ 256GB~4TB memory

❖ Local Storage1:

- ❖ SP450C-M(AVAGO3508) RAID CARD (2G cache) (for SAS/SATA)
- ❖ 2x to 4x 1.8TB SAS HDD (RAID 1 or RAID5)
- ❖ 4-9x(RAID 5) 1.92TB SATA SSD

❖ Local Storage2:

- ❖ SP450C-M(AVAGO3508) RAID CARD (2G cache) (for SAS/SATA)
- ❖ 2x 600GB SAS HDD (RAID 1)
- ❖ 4-11x(RAID 5) 1.92TB SATA SSD

❖ Network:

- ❖ 1x 2*10GE Nic Ports (Pcie card)

The SP450C-M raid card (Avago SAS3508) is an 8-port 12 Gbit/s SAS controller based on the **MegaRAID** architecture. Equipped with **PCIe 3.0 x8** ports and a powerful I/O storage engine.

With our test, the max bandwidth of 3508 is about 6.8 GB/s.

The SP450C-M raid card is equivalent of MegaRAID 9460-8i raid card, and can connect only SAS and SATA devices.

The detail specification shows in

'<https://support.huawei.com/enterprise/en/doc/EDOC1000163569/39417565/overview>' and '<https://www.broadcom.com/products/storage/raid-controllers/megaraid-9460-8i>'.

2288H V6 for B1 on HANA Configuration

		B1 on HANA			
Server Model		2288H V6			
CPU		2* Ice lake 4310	2* Ice lake 4314	2* Ice lake 5318Y	2* Ice lake 8368/8380
Memory Sizing		128GB/256GB/512GB	128GB/256GB/512GB/1024GB	128GB/256GB/512GB/1024GB/2048GB	128GB/256GB/512GB/1024GB/2048GB/4096GB
Configuration1 (SAS SSD)	Log volume & Data volume	2x (RAID 1),3-21x(RAID 5) 960GB SAS SSD; each time based on minimal capacity requirements			
	Shared volume	1*RAM from 2x to 4x 1.8TB SAS HDD RAID1/RAID5 or 2x (RAID 1),3-21x(RAID 5) 960GB SAS SSD			
Configuration2 (SAS SSD)	Log volume & Data volume	2x (RAID 1),3-11x(RAID 5) 1.92TB SAS SSD; each time based on minimal capacity requirements			
	Shared volume	1*RAM from 2x to 4x 1.8TB SAS HDD RAID1/RAID5 or 2x (RAID 1),3-11x(RAID 5) 1.92TB SAS SSD			
Configuration3 (SAS SSD)	Log volume & Data volume	2x (RAID 1),3-6x(RAID 5) 3.84TB SAS SSD; each time based on minimal capacity requirements			
	Shared volume	1*RAM from 2x to 4x 1.8TB SAS HDD RAID1/RAID5 or 2x (RAID 1),3-6x(RAID 5) 3.84TB SAS SSD			
Configuration4 (SAS SSD)	Log volume & Data volume	2x (RAID 1),3-13x(RAID 5) 1.6TB SAS SSD; each time based on minimal capacity requirements			
	Shared volume	1*RAM from 2x to 4x 1.8TB SAS HDD RAID1/RAID5 or 2x (RAID 1),3-13x(RAID 5) 1.6TB SAS SSD			
Configuration5 (SAS SSD)	Log volume & Data volume	2x (RAID 1),3-7x(RAID 5) 3.2TB SAS SSD; each time based on minimal capacity requirements			
	Shared volume	1*RAM from 2x to 4x 1.8TB SAS HDD RAID1/RAID5 or 2x (RAID 1),3-7x(RAID 5) 3.2TB SAS SSD			
Configuration6 (SATA SSD)	Log volume & Data volume	4-11x(RAID 5) 1.92TB SATA SSD; each time based on minimal capacity requirements			
	Shared volume	1*RAM from 2x to 4x 1.8TB SAS HDD RAID1/RAID5 or 4-11x(RAID 5) 1.92TB SATA SSD			
File-system		XFS			
OS		SLES 15 SP2			

Disk Configuration Details --- shared volume from SSD

Total memory sizing (GB)	Configuration (raid1 or raid5)													
	data+log+shared(shared volume from SSD)												OS volume	
	Configuration1 (SAS)		Configuration2 (SAS)		Configuration3 (SAS)		Configuration4 (SAS)		Configuration5 (SAS)		Configuration6 (SATA)		HDD	
	disk type (GB)	Qty (min)	disk type (GB)	Qty (min)	disk type (GB)	Qty (min)	disk type (GB)	Qty (min)	disk type (GB)	Qty (min)	disk type (GB)	Qty (min)	disk type (GB)	Qty (min)
128	960	2	1920	2	3840	2	1600	2	3200	2	1920	4	600	2
256		3		2		2		2		2		4		2
512		4		3		2		3		2		4		2
1024		7		4		3		5		3		4		2
2048		12		7		4		8		5		7		2
4096		21		11		6		13		7		11		2

Disk Type	Disk Model	Volume Size	Interface	Sequential Read/Write Bandwidth	Random Read/Write IOPS@4KB	Disk Specification Link
SAS SSD	ES3500S V5	960GB	SAS 3.0 12Gb/s	2200/900 MB/s@1MB	335k/38k	https://e.huawei.com/en/material/datacenter/server/e168646968ed445d850639b048c263df
SAS SSD		1.92TB		2200/1800 MB/s@1MB	425k/75k	
SAS SSD		3.84TB		2200/2000 MB/s@1MB	430k/108k	
SAS SSD		1.6TB		2200/1800 MB/s@1MB	425k/155k	
SAS SSD		3.2TB		2200/2000 MB/s@1MB	430k/155k	
SATA SSD	Micron 5300 MAX	1.92TB	SATA 6Gb/s	540/520 MB/s@128KB	95k/70k	https://www.micron.com/-/media/client/global/documents/products/product-flyer/5300_product_brief.pdf

Disk Configuration Details --- shared volume from HDD

Total memory sizing (GB)	Configuration (raid1 or raid5)													
	data+log												OS+shared (shared volume from HDD)	
	Configuration1 (SAS)		Configuration2 (SAS)		Configuration3 (SAS)		Configuration4 (SAS)		Configuration5 (SAS)		Configuration6 (SATA)		HDD	
	disk type (GB)	Qty (min)	disk type (GB)	Qty (min)	disk type (GB)	Qty (min)	disk type (GB)	Qty (min)	disk type (GB)	Qty (min)	disk type (GB)	Qty (min)	disk type (GB)	Qty (min)
128	960	2	1920	2	3840	2	1600	2	3200	2	1920	4	1800	2
256		3		2		2		2		2		4		2
512		4		3		2		3		2		4		2
1024		6		4		3		4		3		4		2
2048		9		5		3		6		4		5		3
4096		16		9		5		10		6		9		4

Disk Type	Disk Model	Volume Size	Interface	Sequential Read/Write Bandwidth	Random Read/Write IOPS@4KB	Disk Specification Link
SAS SSD	ES3500S V5	960GB	SAS 3.0 12Gb/s	2200/900 MB/s@1MB	335k/38k	https://e.huawei.com/en/material/datacenter/server/e168646968ed445d850639b048c263df
SAS SSD		1.92TB		2200/1800 MB/s@1MB	425k/75k	
SAS SSD		3.84TB		2200/2000 MB/s@1MB	430k/108k	
SAS SSD		1.6TB		2200/1800 MB/s@1MB	425k/155k	
SAS SSD		3.2TB		2200/2000 MB/s@1MB	430k/155k	
SATA SSD	Micron 5300 MAX	1.92TB	SATA 6Gb/s	540/520 MB/s@128KB	95k/70k	https://www.micron.com/-/media/client/global/documents/products/product-flyer/5300_product_brief.pdf

DIMM population for SAP HANA Intel Ice lake based systems (memory configuration)

Ice Lake Memory Configuration																		
Controller #	0								1								(GB)per CPU	Capacity(GB) with #CPUs
Channel #	0		1		2		3		0		1		2		3			
DIMM slot #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16		2
1DPC 8GB DIMM	8		8		8		8		8		8		8		8		64	128
2DPC 8GB DIMM	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	128	256
1DPC 16GB DIMM	16		16		16		16		16		16		16		16		128	256
2DPC 16GB DIMM	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	256	512
1DPC 32GB DIMM	32		32		32		32		32		32		32		32		256	512
2DPC 32GB DIMM	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	512	1024
1DPC 64GB DIMM	64		64		64		64		64		64		64		64		512	1024
2DPC 64GB DIMM	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	1024	2048
1DPC 128GB DIMM	128		128		128		128		128		128		128		128		1024	2048
2DPC 128GB DIMM	128	128	128	128	128	128	128	128	128	128	128	128	128	128	128	128	2048	4096

Test Environment Configuration---- Read-Sensitive SAS SSD configuration

RAID Configuration						
Disk Type	Size and Number	Model	RAID Device	RAID LEVEL	Strip Size	Write policy
SAS HDD	2x 600GB	N600S1210W4	SP450C-M(AVAGO3508) RAID CARD	RAID1	128K	Write Back with BBU
SAS SSD	2 x 960GB	ES3500S960GW2	SP450C-M(AVAGO3508) RAID CARD	RAID1	128K	Write Back with BBU

Test Environment Configuration---- Read-Write-Mix SAS SSD configuration

RAID Configuration						
Disk Type	Size and Number	Model	RAID Device	RAID LEVEL	Strip Size	Write policy
SAS HDD	2x 600GB	N600S1210W4	SP450C-M(AVAGO3508) RAID CARD	RAID1	128K	Write Back with BBU
SAS SSD	2 x 1.6TB	ES3600S1600GW2	SP450C-M(AVAGO3508) RAID CARD	RAID1	128K	Write Back with BBU

Test Environment Configuration----SATA SSD configuration

RAID Configuration						
Disk Type	Size and Number	Model	RAID Device	RAID LEVEL	Strip Size	Write policy
SAS HDD	2x 600GB	N600S1210W4	SP450C-M(AVAGO3508) RAID CARD	RAID1	128K	Write Back with BBU
SATA SSD	4 x 1.92TB	5300MAX1920G2	SP450C-M(AVAGO3508) RAID CARD	RAID5	128K	Write Back with BBU

Test OS Configuration For SUSE(Shared volume from SSD)

OS Configuration						
Physical Disk	Volume Group	Logic Volume	Mount Point	File System Type	Partition Size	Description
RAID 1				-	600 GB	Used to install the OS.
sda1	---	-	/boot/efi	fat	1GB	
sda2	vg_os	lv_swap	swap	swap	20 GB	
		lv_sap	/usr/sap	ext4	200GB	
		lv_root	/	ext4	Remaining space	
RAID1 or RAID5				-		For Hana storage
sdb	vg_hana	lv_hana_data	/hana/ data	xfs	3*RAM Size	
		lv_hana_share d	/hana/shared	xfs	1*RAM Size	
		lv_hana_log	/hana/log	xfs	512GB	

Read-Sensitive SAS SSD Test Environment --- Hardware(2x 960GB SAS SSD) SLES15.2

Model	Description	Unit Quantity
2288H V6		
Base Configuration		
02313EHF	2288H V6 System Chassis Module	1
PAC2000S12-BE	Function Module,PAC2000S12-BE,PAC2000S12-BE,Function Module,PAC2000S12-BE,PAC2000S12-BE,Server Platinum 2000W,power supply	2
CPU		
02313LLB	Intel Xeon Platinum 8368(2.4GHz/38-Core/16.5MB/270W)Ice lake Processor(with heatsink)	2
Memory		
06200330	DDR4 LRDIMM Memory -64GB-3200MT/s-4Rank(2G*4bit)-1.2V-ECC	16
Hard Disk(include Front Panel)		
N600S1210W4	HDD,600GB,SAS 12Gb/s,10K rpm,128MB or above,2.5inch(2.5inch Drive Bay)	2
ES3500S960GW2	Function Module,Servers,ES3500S V5,HW SSD,Disk Unit,960GB SAS 12Gb/s,Read Intensive,2.5inch(2.5inch Drive Bay)	2
RAID Card and Other Accessories		
BC6M40RAID	Function Module,2288H V6,BC6M40RAID,SP450C-M 2G(AVAGO3508)SAS/SATA RAID card,RAID0,1,5,6,10,50,60,12Gb/s,2GB Cache,used for 25HDD	1
BC6M01ESMK	RAID Card Super Capacitor Module,For Power-down Protection	1
PCI-E Card		
CN2ITGAA20	Function Module,X6000,CN2ITGAA20,Intel 82599 2*10GE SFP+ Half-height Half-length Ethernet Card with optical module NCSI Supported,PCIE 2.0 X8-Vendor ID 8086-Device ID 10FB-2	1
Cables and Optional Equipments		
EGUIDER05	Extension Guide Rail	1
Operating System (OS)	SLES for SAP Applications 15.2	1

Read-Write-Mix SAS SSD Test Environment --- Hardware(2x 1600GB SAS SSD) SLES15.2

Model	Description	Unit Quantity
2288H V6		
Base Configuration		
02313EHF	2288H V6 System Chassis Module	1
PAC2000S12-BE	Function Module,PAC2000S12-BE,PAC2000S12-BE,Function Module,PAC2000S12-BE,PAC2000S12-BE,Server Platinum 2000W,power supply	2
CPU		
02313LLB	Intel Xeon Platinum 8368(2.4GHz/38-Core/16.5MB/270W)Ice lake Processor(with heatsink)	2
Memory		
06200330	DDR4 LRDIMM Memory -64GB-3200MT/s-4Rank(2G*4bit)-1.2V-ECC	16
Hard Disk(include Front Panel)		
N600S1210W4	HDD,600GB,SAS 12Gb/s,10K rpm,128MB or above,2.5inch(2.5inch Drive Bay)	2
ES3600S1600GW2	Function Module,Servers,ES3600S V5,HW SSD,Disk Unit,1600GB SAS 12Gb/s,Read Intensive,2.5inch(2.5inch Drive Bay)	2
RAID Card and Other Accessories		
BC6M40RAID	Function Module,2288H V6,BC6M40RAID,SP450C-M 2G(AVAGO3508)SAS/SATA RAID card,RAID0,1,5,6,10,50,60,12Gb/s,2GB Cache,used for 25HDD	1
BC6M01ESMK	RAID Card Super Capacitor Module,For Power-down Protection	1
PCI-E Card		
CN2ITGAA20	Function Module,X6000,CN2ITGAA20,Intel 82599 2*10GE SFP+ Half-height Half-length Ethernet Card with optical module NCSI Supported,PCIE 2.0 X8-Vendor ID 8086-Device ID 10FB-2	1
Cables and Optional Equipments		
EGUIDER05	Extension Guide Rail	1
Operating System (OS)	SLES for SAP Applications 15.2	1

SATA SSD Test Environment --- Hardware(4x 1920GB SATA SSD)

SLES15.2

Model	Description	Unit Quantity
2288H V6		
Base Configuration		
02313EHF	2288H V6 System Chassis Module	1
PAC2000S12-BE	Function Module,PAC2000S12-BE,PAC2000S12-BE,Function Module,PAC2000S12-BE,PAC2000S12-BE,Server Platinum 2000W,power supply	2
CPU		
02313LLB	Intel Xeon Platinum 8368(2.4GHz/38-Core/16.5MB/270W)Ice lake Processor(with heatsink)	2
Memory		
06200330	DDR4 LRDIMM Memory -64GB-3200MT/s-4Rank(2G*4bit)-1.2V-ECC	16
Hard Disk(include Front Panel)		
N600S1210W4	HDD,600GB,SAS 12Gb/s,10K rpm,128MB or above,2.5inch(2.5inch Drive Bay)	2
5300MAX1920G2	SSD,1920GB,SATA 6Gb/s,Mixed Use,micron 5300 MAX,2.5inch(2.5inch Drive Bay)	4
RAID Card and Other Accessories		
BC6M40RAID	Function Module,2288H V6,BC6M40RAID,SP450C-M 2G(AVAGO3508)SAS/SATA RAID card,RAID0,1,5,6,10,50,60,12Gb/s,2GB Cache,used for 25HDD	1
BC6M01ESMK	RAID Card Super Capacitor Module,For Power-down Protection	1
PCI-E Card		
CN2ITGAA20	Function Module,X6000,CN2ITGAA20,Intel 82599 2*10GE SFP+ Half-height Half-length Ethernet Card with optical module NCSI Supported,PCIE 2.0 X8-Vendor ID 8086-Device ID 10FB-2	1
Cables and Optional Equipments		
EGUIDER05	Extension Guide Rail	1
Operating System (OS)	SLES for SAP Applications 15.2	1

hdpparam Parameters

parameters for DATA volume:

async_write_submit_active:on
async_read_submit:on
async_write_submit_blocks:all

parameters for LOG volume:

async_write_submit_active:on
async_read_submit:on
async_write_submit_blocks:all



HUAWEI ENTERPRISE ICT SOLUTIONS **A BETTER WAY**

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